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Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1. (currently amended) A sensor system for vehicle steering control comprising:

a plurality of global navigation satellite sensor systems (GNSS) including receivers and antennas at a fixed spacing to determine a vehicle position, velocity, ~~and at least one of a~~ heading ~~angle, a pitch~~ angle and [[a]] roll angle based on carrier phase corrected real time kinematic (RTK) position differences, at least one of said antennas having a fixed offset to ground;

wherein said roll angle facilitates correction of ~~said~~ lateral motion induced cross-track position errors resultant from motion of said antennae as said ~~vehicles~~ vehicle moves based on ~~an~~ said offset to ground and said roll angle; and

a control system configured to receive said vehicle position, heading angle, and ~~at least one of~~ roll ~~and pitch~~ angle, and configured to generate a steering command to a vehicle steering system.

Claim 2. (original) The sensor system of Claim 1 wherein said steering command is based on a cross-track error to at least one of a desired path, trajectory, and location and said vehicle heading angle.

Claim 3. (original) The sensor system of Claim 2 wherein said control system employs at least one of said cross-track error, a heading error, rate of change of

cross-track error, rate of change of heading, vehicle forward velocity, and combinations thereof to formulate said steering command.

Claim 4. (currently amended) The sensor system of Claim 1, further including a yaw rate gyro to provide rate of turn with reduced noise and rapid response over a rate of turn computed from said ~~GPS~~ GNSS based heading angle.

Claim 5. (currently amended) The sensor system of Claim 1, further including a roll rate gyro to provide roll rate with reduced noise and rapid response over a roll rate computed from said ~~GPS~~ GNSS based roll angle.

Claim 6. (original) The sensor system of Claim 1 wherein said antennae and said receivers are enclosed in a single enclosure.

Claim 7. (original) The sensor system of Claim 6, further including at least one of a yaw rate gyro and a roll rate gyro in said enclosure.

Claim 8. (original) The sensor system of Claim 1, wherein said GNSS includes at least one of global positioning system (GPS), differential global positioning system (DGPS), Global Navigation System (GLONAS), Wide Area Augmentation System (WAAS) and combinations including at least one of global positioning system (GPS), differential global positioning system (DGPS), Global Navigation System (GLONAS), Wide Area Augmentation System (WAAS).

Claim 9. (currently amended) The sensor system of Claim 6, further including a mounting base ~~configure~~ configured to mount said enclosures and provide an unimpeded view to satellites of said GNSS.

Claim 10. (currently amended) A method for computing a position of a vehicle comprising:

initializing [[a]] global navigation satellite sensor systems (GNSS); computing a first position of a first GNSS antenna on said vehicle; computing a second position of a second GNSS antenna;

calculating a heading as a vector perpendicular to a vector joining said first position and said second position, in a horizontal plane aligned with said vehicle;

computing a roll angle of said vehicle as an arc-tangent of a ratio of differences in heights of said first GNSS antenna and said second GNSS antenna divided by a spacing between their respective phase centers; and

calculating an actual position at a center of said vehicle projected to ground using said computed roll angle and a known height from said ground of at least one of said first GNSS antenna and said second GNSS antenna.

Claim 11. (original) The method of Claim 10, further including computing another position of another GNSS antenna, and computing a pitch angle and another roll angle.

Claim 12. (withdrawn) A method of controlling a vehicle comprising:

computing a position and a heading for the vehicle;

computing a steering control command; based on a proportionality factor multiplied by a difference in a desired position versus an actual position plus a second proportionality factor multiplied by a difference in a desired heading versus an actual heading, said second proportionality factor ensuring that when said vehicle attains said desired position the vehicle is also directed to said desired heading, and thereby avoiding crossing a desired track;

wherein a recursive adaptive algorithm is employed to characterize the vehicle response and selected dynamic characteristics;

applying selected control values to a vehicle steering control mechanism and measuring responses of the vehicle thereto;

calculating response times and characteristics for the vehicle based on said responses; and

calibrating said control commands by applying a modified control command based on said responses to achieve a desired response.